

**Table 2. Categories of Work Currently Planned or Underway for Motor Vehicle Fuels and Fuel Additives (F/FA)<sup>1</sup>**

	Animal						Human				Exposure			
	Pharmacokinetics	Mutagenicity	Sub-chronic Toxicity	Chronic Non-Cancer	Reproductive Toxicity	Developmental Toxicity	Neuro-toxicity	Oncogenicity	Acute Toxicity	Chronic Non-Cancer	Pharmacokinetics	Emissions	Transport and Fate	
<b>Neat Additive:</b>														
MTBE														
vapor	T ?	3 4												
liquid														
EtOH														
vapor	T ?	3 4												
liquid														
ETBE														
vapor	T T T ? <sup>3</sup>	6 4 T T <sup>6</sup>	T T <sup>6</sup>	T <sup>6</sup>	T <sup>6</sup>	T T <sup>6</sup>	T T <sup>6</sup>	T T <sup>6</sup>	T T <sup>6</sup>	T T <sup>6</sup>	T T <sup>6</sup>	T T <sup>6</sup>	T T <sup>6</sup>	
liquid														
TAME														
vapor	T T T ? <sup>3</sup>	8 4 T T <sup>8</sup>	T T <sup>8</sup>	T T <sup>8</sup>	T T <sup>8</sup>	T T <sup>8</sup>	T T <sup>8</sup>	T T <sup>8</sup>	T T <sup>8</sup>	T T <sup>8</sup>	T T <sup>8</sup>	T T <sup>8</sup>	T T <sup>8</sup>	
liquid														
TBA														
vapor														
liquid														
DPE														
vapor														
liquid														
TAME, etc.														
<b>Fuel Product:</b>														
"Baseline" gasoline:														
evap.	T	3	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup> T <sup>10</sup>
combust.														

**Table 2 (cont'd). Categories of Work Currently Planned or Underway for Motor Vehicle Fuels and Fuel Additives (F/FA)<sup>1</sup>**

	Animal										Human				Exposure	
	Pharmacokinetics	Mutagenicity	Sub-chronic Toxicity	Chronic Non-cancer	Reproductive Toxicity	Developmental Toxicity	Neuro-toxicity	Onco-genicity	Acute Toxicity	Chronic Non-cancer	Cancer	Pharmacokinetics	Emissions	Transport and Fate	Monitoring	
<b>Post-1990 gasoline plus:</b>																
MTBE <sup>11</sup>	? <sup>3</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>12</sup>				T <sup>9</sup> T <sup>10</sup>	T <sup>3</sup>	
EOH <sup>11</sup>		T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>					T <sup>9</sup> T <sup>10</sup>	T <sup>14</sup>	
ETBE <sup>11</sup>		T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>				T <sup>9</sup> T <sup>10</sup>	T <sup>14</sup>	
TAME <sup>11</sup>		T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>			T <sup>9</sup>	T <sup>16</sup>	
TBA <sup>11</sup>		T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>			T <sup>9</sup>		
DPE <sup>11</sup>		T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>	T <sup>9</sup>			T <sup>9</sup>		
TAME, etc. <sup>11</sup>																

<sup>1</sup>T = planned; TT = underway; ? = under consideration, but no firm commitment for testing

<sup>2</sup>Oxygenated Fuels Association and Chemical Industry Institute of Toxicology — Pharmacokinetics and cancer mechanisms studies of MTBE

<sup>3</sup>Health Effects Institute — Approved for funding in 1996

<sup>4</sup>Information on these endpoints could be required under Alternative Tier 2 or Tier 3 provisions of the F/FA rule (see footnote 9), but no decision has been made.

<sup>5</sup>Bologna Institute of Oncology — Series of cancer studies by ingestion route (Belleggi et al., 1995)

<sup>6</sup>ARCO Chemical — Voluntary testing of ETBE

<sup>7</sup>National Toxicology Program — HEI nomination of ETBE and TAME (alone and in combination with gasoline vapors) for cancer studies; HEI nomination of short-chain aldehydes

<sup>8</sup>EPA/OPTIS and API — TSCA Enforceable Consent Agreement for testing of TAME

<sup>9</sup>Information on these endpoints is required under the F/FA rule in accordance with Section 211 of the Clean Air Act; if adequate information is not already available for these endpoints, standard inhalation toxicity assays are prescribed under Tier 2 of the rule (see Table 3 for information on these tests); substitute or more extensive testing could be required under other provisions of the rule (Alternative Tier 2 or Tier 3).

<sup>10</sup>Auto/Oil Air Quality Improvement Research Program — Emissions characterization of different fuel formulations

<sup>11</sup>Includes both evaporative and combustion emissions

<sup>12</sup>EPA/ORD/NHEERL and/or Environmental and Occupational Health Sciences Institute — Laboratory studies of human volunteers with self-reported sensitivity to oxyfuels

<sup>13</sup>U.S. Geological Survey — Measurements of MTBE in air, precipitation, runoff, surface water, and ground water

<sup>14</sup>American Petroleum Institute (API) — Personal exposure measurements of service station attendants and mechanics

<sup>15</sup>AK Dept. Environmental Conservation cooperative agreement with EPA/ORD/NERL — Emissions characterization projects related to ethanol-oxygenated gasoline in Alaska

<sup>16</sup>API — Microenvironmental measurements of non-occupational personal exposures

**N.B.:** Check marks do not necessarily represent equivalent levels of effort. The headings may subsume quite disparate levels of testing or research efforts (e.g., the pharmacokinetics studies for "pure" MTBE are more extensive than those for ETBE or TAME).



